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Anomalies in maize and its relatives—I

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(WITH FIVE TEXT FIGURES)

A series of investigations on the grasses included in the tribe Maydeae (Tripsaceae in the recent literature) have incidentally brought under observation a number of characteristics sufficiently infrequent in occurrence to be termed anomalies. Some of these are unmistakably peculiarities of development determined by disease, mechanical injury, or other environmental influence; for others no definite cause can readily be assigned. Some are non-inherited fluctuations in which highly specialized structures revert in development to a more primitive condition; but others cannot be explained in terms of past history.

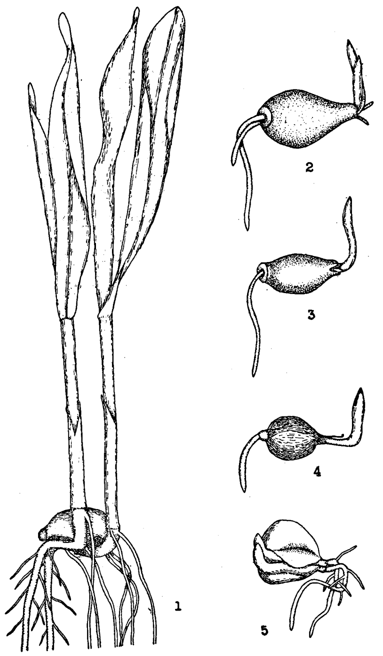
While none of these teratological occurrences have any economic significance, and few of them make any definite contribution to matters of purely botanical interest, yet they should be recorded in the literature of science for whatever they may be worth in our efforts to understand the maize plant and its relatives. Accordingly, the present is the first of a series of such contributions, which the writer purposes to make from time to time.

FALSE POLYEMBRYONY

In Maize.—On two occasions there have been found seeds of maize, each of which apparently contained two embryos. The first was a grain of Black Mexican sweet corn, which, due to wet weather at the time of maturity, had germinated while still inside the husk. Two plumules and two primary roots had emerged from the pericarp (FIG. 5). The second was in a lot of seedlings being grown for study. One grain was found bearing two stalks and two well-developed root systems (FIG. 1).

But dissection showed in each case that, although the coleoptile and coleorhiza were also duplicated, there was only one cotyledon.

The anomalous embryo had doubtless arisen from a single fecundated egg, and had been influenced in development by some unexplained disturbance of polarity at the time of the differentiation of the embryonal axis in the thalloid primordium. But in none of the hundreds of embryos that have been sectioned in a study of this phase of development has there been observed anything to account for this division of the growing points.



FIGS. 1 and 5. Germinating grains of corn with duplicated embryonal parts. FIG. 2. Fruit of *Coix* with two radicles and two plumules. FIG. 3. Smaller fruit included in that shown in FIG. 2. FIG. 4. Caryopsis from the fruit shown in FIG. 2.

Three or four other instances of apparently the same anomaly have been brought to the writer's attention at different times, but opportunity for satisfactory examination has in each case been lacking. In one of these, the grain bore three stalks. Otherwise there is no ground for belief that any of these were essentially different from those described.

If we except the "fasciated" grains that have been reported,* which, being the results of fusion of grains, are really out of the realm of our present consideration, there seems to be no case on record of the occurrence of two separate embryos in any one seed of maize. The limited number of these anomalies that have been examined, however, leaves ample room for the future discovery of true polyembryony in maize.

In Coix.—The emergence of two plumules and two primary roots from one fruit of Job's Tears (*Coix lachryma-Jobi* L.) led to an examination to determine whether or not the enclosed seed had two embryos.

Removal of the hard outer shell (FIG. 2) disclosed, in addition to the expected caryopsis (FIG. 4) with its quota of bracts, another entire fruit (FIG. 3). The shell of the latter was thinner and softer than in the ordinary fruit.

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* Wolfe, T. K. Fasciation in maize kernels. Amer. Nat. 50: 306–309. *f. 1–3.* 1916.

The structure of the anomaly is readily explained, but the data at hand afford no explanation of the cause. The inflorescence of *Coix* consists of a single axis bearing on its terminal portion ten to fifty or more staminate spikelets, and at its base one to three pistillate spikelets. Each of the latter is surrounded by a modified leaf sheath which matures into the stony shell of the fruit. Through failure of the axis to elongate sufficiently in development, the upper spikelet and its sheath had been included in the spathe of the lower.

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